The claimed invention is:

1. A chemical vapor deposition process for the preparation of a single-wall carbon nanotube, comprising:

contacting a carbon-containing gas composition with a porous membrane having a first side and a second side, wherein the first side is opposite to the second side, and wherein a thin catalyst layer is present on at least the first side of the membrane,

at a temperature sufficient to decompose said carbon-containing gas composition in the presence of said catalyst causing growth of a single-wall carbon nanotube,

wherein a pressure differential exists across the porous membrane, the pressure on the second side being less than that on the first side.

2. The process according to claim 1, wherein said growth of a single-wall carbon nanotube predominantly occurs on the second side of said porous membrane.

3. The process according to claim 1, wherein said growth of a single-wall carbon nanotube predominantly occurs between the catalyst and the first side of the porous membrane.

4. The process according to claim 1, wherein said thin catalyst layer is present only on the first side of said porous membrane.

CONTINUOUS GROWTH OF SINGLE-WALL CARBON NANOTUBES USING CHEMICAL VAPOR DEPOSITION

5. The process according to claim 1, wherein said carbon-containing gas composition comprises methane gas.

6. The process according to claim 5, wherein said carbon-containing gas composition comprises methane, hydrogen, and an inert gas.

7. The process according to claim 6, wherein said inert gas is argon gas.

8. The process according to claim 1, wherein said porous membrane has a particle size less than about 2 micron.

9. The process according to claim 8, wherein said membrane has a particle size less than about 500 nm.

10. The process according to claim 1, wherein said porous membrane is selected from the group consisting of: alumina and stainless steel.

11. The process according to claim 1, wherein said catalyst is a catalyst composition comprising iron and molybdenum.

12. The process according to claim 11, wherein said catalyst composition further comprises alumina.

13. The process according to claim 1, wherein said temperature sufficient to decompose the carbon-containing gas ranges from about 670°C to about 800°C.

CONTINUOUS GROWTH OF SINGLE-WALL CARBON NANOTUBES USING CHEMICAL VAPOR DEPOSITION

14. The process according to claim 1, wherein said pressure differential ranges from about 50 to about 500 Torr.

15. The process according to claim 14, wherein said pressure differential ranges from about 200 to about 300 Torr.

16. A chemical vapor deposition process for producing a single-wall carbon nanotube, comprising:

    A chemical vapor deposition process for producing a single-wall carbon nanotube, comprising:

17. The process according to claim 16, wherein the ratio of Al_20_3:Fe in said catalyst composition ranges from about 50:1 to about 2:1, the ratio of Al_20_3:Mo in said catalyst composition ranges from about 100:1 to about 5:1, and the ratio of Fe:Mo in said catalyst composition ranges from about 15:1 to about 1:2.

18. The process according to claim 17, wherein said catalyst has a ratio of $A1_20_3$:Fe:Mo of about 9:1: ⅓.

19. The process according to claim 16, wherein said inert gas is argon gas.

20. The process according to claim 16, wherein the ratio of methane: hydrogen in said carbon-containing gas composition ranges from about 5:1 to about 1:5 by volume, the ratio of methane:inert gas in said carbon-

containing gas composition ranges from about 1:2 to about 1:50 by volume, and the ratio of hydrogen:inert gas in said carbon-containing gas composition ranges from about 1:2 to about 1:50 by volume.

21. The process according to claim 20, wherein said carbon-containing gas composition has a ratio of methane: hydrogen: inert gas of about 1:1:10 by volume.

22. An apparatus for conducting a chemical vapor deposition process, comprising:

a first tube and a second tube, said first tube disposed at least within a portion of the second tube, said first tube including a first opening and a second opening, said first opening facing the interior of the second tube, and said second opening being coupled to

a vacuum;

a porous membrane contiguous to the first opening; and

a thin catalyst layer contiguous to the at least a portion of said porous membrane that faces the interior of the second tube;

23. The apparatus of claim 22, wherein said porous membrane cinctures said first opening.

24. The apparatus of claim 22, wherein said porous membrane has a particle size less than about 2 micron.

25. The apparatus of claim 24, wherein said membrane has a particle size